How to Use Planned Multiple Matings Per Estrus to Improve Pregnancy Rates Achieved by Some Aged Subfertile Thoroughbred Stallions

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1. Introduction

The ability of many stallions to successfully breed large books of mares has become common knowledge in the Thoroughbred industry. Of course, logic and experience would suggest that this is a highly stallion-dependent phenomenon, which requires excellent libido and physical stamina as well as good inherent fertility. The most pre-potent stallions (i.e., those able to stamp their phenotype on their offspring or consistently produce winners) remain in demand for many years. Some stallions remain popular, breeding large books of mares, for most of their breeding life. When an aging but previously fertile stallion begins to experience declining pregnancy rates, it is often caused by ejaculation of low numbers of normal motile sperm, which is often medically untreatable.1 When sperm quality and livability are poor, routine breeding management of the stallion (i.e., breeding mares one time within 2 days of ovulation)2 will seldom result in satisfactory pregnancy rates. In such cases, managers will often reduce the mare book size to decrease the number of covers required and thus, increase the number of sperm in each ejaculate. They will also employ reinforcement breeding to increase the number of sperm entering the mare reproductive tract. If these methods do not improve pregnancy rates, few options remain for attempting to improve fertility.

One option that can be tried with Thoroughbred stallions of declining fertility is planned multiple matings (2–3 covers per estrus with the last cover occurring shortly before ovulation), which may improve pregnancy rates in some instances. The strategy proposed is directed toward maximizing the number of live normal sperm that will be available in the oviducts as near to the time of expected fertilization as possible.

2. Materials and Methods

Data is presented from two aged (24 yr) Thoroughbred stallions that achieved suboptimal pregnancy rates when mated using standard management protocols (i.e., breeding mares one time per estrus) at two studs in central Kentucky. Although this mating strategy had resulted in normal pregnancy rates
ing the 1–2 day period before ovulation are those likely to benefit from planned multiple matings during estrus for most mares ovulate within 2 days of breeding. Therefore, using planned multiple matings during estrus for most Thoroughbred stallions with normal fertility would be considered unnecessary. When routine breeding management (mating one time within 2 days of ovulation) fails to result in normal pregnancy rates, planned multiple matings might be considered. The authors believe Thoroughbred stallions most likely to benefit from planned multiple matings during the 1–2 day period before ovulation are those found to still be producing adequate total numbers of sperm in ejaculates; however, a low percentage of those sperm are morphologically normal and progressively motile. Any resulting improvement in pregnancy rates may be caused by enhancing the number of normal sperm accessing the oviducts or ensuring that short-lived sperm are more likely to be available in the oviducts at the time of fertilization. Therefore, when multiple breedings with cryopreserved sperm (which are believed to have a shortened lifespan) improve pregnancy rates in horses. For example, frozen-thawed sperm from stallions of low fertility have been shown to have shorter lifespan in oviductal epithelial cell cultures than did frozen-thawed sperm from stallions of high fertility. Also, multiple inseminations with cooled semen at 12-h intervals between 24 h before and 12 h after ovulation resulted in higher pregnancy rates than single inseminations.

Multiple matings per estrus require smaller mare books than usual, because the stallion will be mated two or three times to each mare in a 1- or 2-day period. If the size of the mare book is not substantially reduced, it will become impossible to ensure that mares are covered more than one time per estrus period. Additionally, the stallion may be overused and bred too often, resulting in each ejaculate containing such low numbers of normal sperm that pregnancy rates would suffer. Although the book size is reduced for the aged stallion because of the requirement for multiple matings per estrus, he will be mating just as often as a stallion with a book of mares 2–3 times larger. Therefore, the stallion should be in good body condition with physical soundness sufficient to maintain an active mating schedule.

The mare owner/manager should be advised of the plan to mate their mare more than one time per estrus, because multiple van trips are required (increasing expense). Older mares that tend to accumulate fluid after breeding might not be good candidates for this multiple-mating strategy. Close communication between mare and stallion managers is also very essential for this plan to work. For this reason, when planned multiple matings per estrus is to be done, some managers prefer to have the mares maintained at the same farm where the stallion stands, which also makes it easier to get the mare to the breeding shed. This allows the farm veterinarian to perform reproductive examinations as often as necessary to enhance the ability to accurately predict the optimal time for scheduling the 2–3 covers in the day or so before each mare will ovulate. In general, the veterinarian will monitor each mare for intensity of estrus expression, amount of uterine edema and cervical relaxation, and follicular growth/size until favorable criteria are present that indicate that the mare should respond to an ovulation-inducing drug such as deslorelin. The ovulation-inducing drug should be given the morning before the first cover is scheduled, and the ma-
ing sequence should begin the same day. If the mare is to be bred three times, she is mated that morning, that night, and the following morning or afternoon (Fig. 1). If the mare is to be bred only two times, she is mated that afternoon and again the following morning or afternoon (Fig. 2). If ovulation proceeds as planned (i.e., occurring 36–48 h after administration of the ovulation-inducing drug), the multiple matings will have been accomplished just before ovulation. If the mare has not ovulated on schedule, additional matings would be indicated.

Fig. 1. Schematic representation of the management strategy for planned breeding of the mare three times during the same estrus.

Fig. 2. Schematic representation of the management strategy for planned breeding of the mare two times during the same estrus.

In summary, for some valuable older stallions with declining fertility associated with ejaculation of low numbers of normal motile sperm, planned multiple matings during the same estrus is a management technique that can be used. The extra expense and management for each mare could be justified by an increased chance of obtaining a pregnancy from such a valuable older stallion that otherwise might be considered to be at the end of his breeding career.

References